

Installation Instructions

HP StorageWorks Replacing an HSG60 and HSG80 Cache Module

*Read instructions completely before
beginning the installation procedure*



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About this document

This document contains instructions for replacing an HSG60 and HSG80 cache module in an HP StorageWorks HSG60 and HSG80 subsystem. Replacement procedures for the following include:

- [Replacing a cache module in HSG60 and HSG80 single-controller configurations](#), page 2
- [Replacing an HSG60 and HSG80 cache module in dual-redundant controller configurations](#), page 4

Prerequisites and special considerations

- **Single-to-Dual-redundant Configuration Upgrade**—For instructions on upgrading a single-controller configuration to a dual-redundant controller configuration, refer to *HP StorageWorks HSG60 and HSG80 Array Controller and Array Controller Software Maintenance and Service Guide*. A copy of this guide can be downloaded from the HP website at: <http://h18006.www1.hp.com/products/storageworks/acs/index.html>.
- **Cache Module Memory Configuration**—The replacement cache module normally uses DIMMs from the cache module being replaced. When replacing DIMMs, you *must* install DIMMs in the replacement cache module in same position as they were in the cache module that is being replaced.

General information

Replacing a cache module involves transferring the cache memory DIMMs from the failed cache module to the replacement cache module. Use the procedures in this section to replace a cache module in either single or dual-redundant controller configurations.

Note: In dual-redundant configurations, both cache modules *must* contain the same memory configuration, regardless of the ACS version.

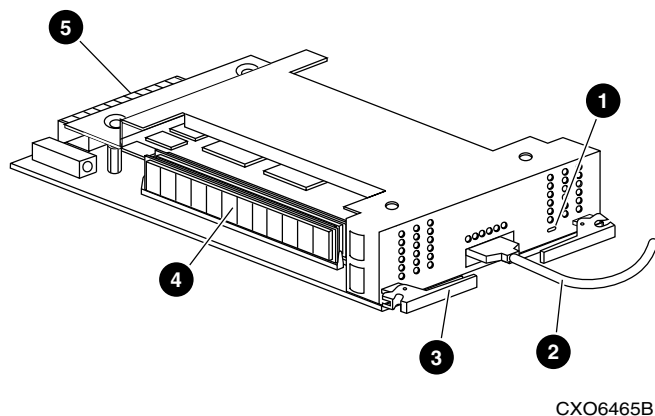
[Figure 1](#) and [Figure 2](#) (on page 2) provide general information about the cache module.

Note: See [Figure 1](#) and [Figure 2](#) (on page 2) for specific component references while replacing cache modules.

Replacing an HSG60 and HSG80 Cache Module Installation
Instructions

Sixth Edition (March 2005)

Part Number: EK-80CAH-IM. F01



- ❶ Cache memory power LED
- ❷ External cache battery (ECB) cable
- ❸ Retaining lever
- ❹ Dual inline memory module (DIMM)
- ❺ Backplane connector

Figure 1: Cache module

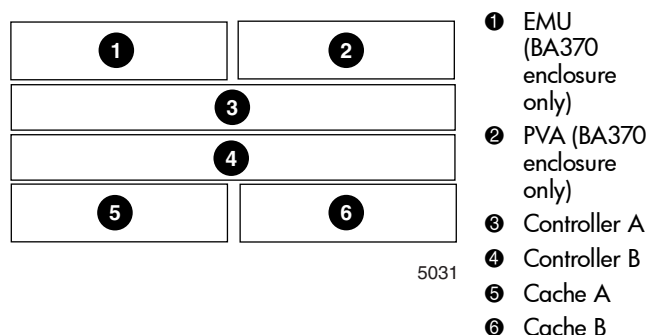


Figure 2: Cache module locations

Note: In [Figure 2](#), the environmental monitoring unit (EMU) and power verification assembly (PVA) modules are present in only HP StorageWorks BA370 enclosures. The controller and cache module locations are consistent with other HP StorageWorks controller enclosures.

Replacing a cache module in HSG60 and HSG80 single-controller configurations

Complete the steps in the following subsections to replace a HSG60 and HSG80 cache module in an HSG60 and HSG80 subsystem. These procedures are applicable to HSG60 and HSG80 cache modules that are in a single-controller configuration.



Caution: Static electricity can easily damage a cache module or a DIMM. Wear a snug-fitting, grounded electrostatic discharge (ESD) wrist strap.

Removing a cache module

Perform the following steps to remove a cache module in a single-controller configuration:

1. Determine whether the controller is operational, and then complete one of the following two options:
 - If the controller is operational, connect a PC or terminal to the controller maintenance port, and then proceed to [step 2](#) below.
 - If the controller is *not* operational, proceed to [step 7](#).
2. From the host console, stop all host activity to the controller, and then dismount the logical units in the subsystem.
3. If you are using Microsoft® Windows 2000 or Windows NT®, shut down the server.
4. Run the *Fault Management Utility (FMU)* to obtain the last failure codes, if necessary.
5. Shut down “this controller” by entering the following command:


```
SHUTDOWN THIS_CONTROLLER
```
6. Proceed to the next step only after the **Reset** button stops flashing and remains on.

Note: After the controller shuts down, the **Reset** button and the first three port LEDs light up. This can take several minutes to happen, depending on the amount of data that needs to be flushed from the cache module.

7. For the cache module to be replaced, complete one of the following two options:
 - For cache modules in an M2100 or M2200 enclosure, disengage both cache module retaining levers, and then remove the cache module.
 - For cache modules in a BA370 enclosure, complete the following substeps:
 - a. Disengage both cache module retaining levers, and then partially remove the cache module—about halfway.



Caution: You must disable the ECB before disconnecting the ECB Y-cable. (If the ECB status light is off, this indicates that the ECB is disabled.) Failure to do so can result in cache module damage.

- b. Disable the ECB by pressing the battery disable switch until the status light stops flashing. In approximately 5 seconds, the status light stops flashing.

Note: Refer to the documentation that shipped with the ECB for additional battery information.

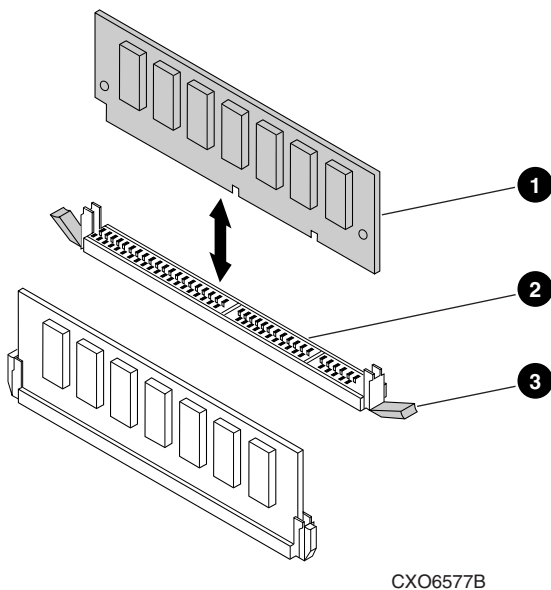
- c. Disconnect the ECB Y-cable from the cache module.

- d. Remove the cache module from the enclosure.
- e. Place the cache module on a grounded antistatic mat or in an antistatic bag.

Note: The DIMMs must be removed for installation in the replacement cache module.

8. Note the location for each DIMM in the cache module that is being replaced, and then install the DIMMs in the corresponding locations in the replacement cache module. Use the following substeps to remove the DIMMs:
 - a. Press down on the DIMM retaining clips (see [Figure 3](#)) at both ends of the DIMM being removed.

Note: To facilitate pressing down on the DIMM retaining clips, consider using the eraser end of a pencil or a small screwdriver.



- ❶ DIMM
- ❷ DIMM slot
- ❸ DIMM retaining clips

Figure 3: Removing or installing a DIMM

- b. Gently remove the DIMM from the DIMM slot, and then place the DIMM on an antistatic bag or a grounded antistatic mat.
- c. Repeat [substep 8a](#) and [substep 8b](#) above for each DIMM.
- d. Proceed to the next section to install the DIMMs in the replacement cache module.

Installing a cache module

Perform the following steps to install an HSG60 and HSG80 cache module in an HSG60 and HSG80 subsystem. These instructions are for cache modules in a single-controller configuration.

Tip: When replacing DIMMs, see [Figure 3](#).

Note: The replacement cache modules *must* contain the same memory configuration as that of the cache module which was removed.

1. Insert each DIMM straight into the appropriate slot of the replacement cache module (see [Figure 3](#)), ensuring that the notches in the DIMM align with the tabs in the slot. Use the following substeps to install the DIMMs:
 - a. Press the DIMM gently into the slot until it is seated at both ends.
 - b. Ensure that the two retaining clips for the DIMM are engaged.
 - c. Make sure both ends of the DIMM are firmly seated in the slot and both retaining clips engage the DIMM.
 - d. Repeat [substep 1a](#) through [substep 1c](#) above for each DIMM.



Caution: Misaligning the module can damage the backplane.

2. Carefully align and partially insert the cache module in the Cache A guide rails.



Caution: If your cache module is in a BA370 enclosure, you must disable the ECB. Failure to disable the ECB can result in cache module damage. To disable the ECB, complete the following steps:

1. Press the battery disable switch on the battery module.
2. Connect the ECB Y-cable to the cache module.

Refer to other ECB documentation for additional and specific ECB details.

3. Insert the replacement cache module completely into the appropriate bay, and then engage the cache module retaining levers.
4. Connect a PC or terminal to the controller maintenance port for the replacement cache module, if not already connected.
5. Restart the controller by pressing the **Reset** button.

Note: A controller restart can take as long as 60 seconds, indicated by the temporary cycling of the port LEDs and a flashing **Reset** button.

Note: If the controller did not restart, use the following steps:

1. Press and hold the **Reset** button.
2. Reseat the controller program card.
3. Release the **Reset** button.

6. From the CLI prompt, display details about the configured controller by entering the following command:

```
SHOW THIS_CONTROLLER FULL
```

7. Set the date and time by entering the following command:

```
SET THIS_CONTROLLER TIME=  
dd-mm-yyyy:hh:mm:ss
```

8. Mount the logical units on the host.
9. If using a Windows 2000 or Windows NT, restart the server.
10. Disconnect the PC or terminal from the controller maintenance port.

Replacing an HSG60 and HSG80 cache module in dual-redundant controller configurations

Perform the steps in the following subsections to replace HSG60 and HSG80 cache modules in a dual-redundant controller configuration.



Caution: Static electricity can easily damage a cache module or a DIMM. Wear a snug-fitting, grounded ESD wrist strap.

To differentiate on which component activity is being completed, symbols are displayed in the margin of text for your convenience. [Table 1](#) describes those symbols.

Table 1: Replacement Procedure Symbols

Symbol	Description
▲	Indicates that the procedural step must be completed for the <i>operational</i> cache module, which is <i>not</i> being replaced.
↺	Indicates that the procedural step must be completed for the <i>cache module that has failed or is to be replaced</i> .
⌚	Indicates that the procedural step must be completed for the <i>field replaceable unit (FRU) or new or replacement cache module being installed</i> .

Note: When replacing DIMMs, see [Figure 3](#) on page 3.

Removing a cache module

Perform the following steps to remove an HSG60 and HSG80 cache module in a dual-redundant configuration:

- ↺ 1. For the controller associated with the cache module to be replaced, complete the following substeps:
 - ↺ a. Connect a PC or terminal to the maintenance port.
 - ↺ b. Run the *Virtual Terminal Display (VTDPY)* utility by entering the following command:

```
RUN VTDPY
```
 - ↺ c. Record which units have I/O activity.
 - ↺ d. Exit *VTDPY* by pressing **Ctrl+Y**.

Note: In Transparent Failover mode, units that failed over due to a **RESTART** command revert back to preferred controller after about 1 minute. The next step may not show that the units have failed over.

- ↺ e. Restart the controller by entering the following command:

```
RESTART THIS_CONTROLLER
```
 - ↺ f. Disconnect the PC or terminal from the maintenance port of the controller having its cache module replaced.
- ▲ 2. For the operational controller, complete the following substeps:
 - ▲ a. Connect the PC or terminal to the maintenance port of the operational controller.

Note: The controller connected to the PC or terminal becomes "this controller." The controller for the cache module being removed becomes the "other controller."

- ▲ b. Display and note the configuration information (for example, the Failover mode, cache mode, serial numbers, SCSI mode, and so forth) for the operational controller by entering the following command:

```
SHOW THIS_CONTROLLER
```
- ▲ c. Disable failover and take the controllers out of the dual-redundant configuration by entering the following command:

```
SET NOFAILOVER
```
- ▲ d. Start the *FRUTIL* by entering the following command:

```
RUN FRUTIL
```


FRUTIL automatically asks you if you want to replace the controller cache battery.
- ▲ e. Enter **N(o)**.
- ▲ f. Enter **1** for the **Replace or remove a controller or cache module** option.



Caution: Early removal of the cache module can result in a controller crash. To prevent this, wait for *FRUTIL* to instruct you to remove the cache module. *FRUTIL* will display the following message when it is ready for you to remove the cache module:

Remove the slot x cache module within 2 minutes.

- ▲ g. Enter **3** for the **Other cache module** option.
- ▲ h. Enter **Y(es)** to confirm the intent to remove the slot x cache module.
FRUTIL quiesces all device ports, indicates a 2-minute limit to remove the cache module, and then begins counting down the time in 10-second intervals.



Caution: Wait for *FRUTIL* to quiesce the device ports—indicated by an All device ports quiesced message. Failure to allow the ports to quiesce can result in data loss. Quiescing can take several minutes.

Note: A countdown timer allows you a total of 2 minutes to remove the cache module. After 2 minutes, “this controller” exits *FRUTIL*, restarts the “other controller,” and then resumes operations. If this happens, perform the following steps:

1. Connect the PC or terminal to the “other controller.”
2. Shut down the “other controller” by issuing the command:

```
SHUTDOWN THIS_CONTROLLER
```

3. Disconnect the PC or terminal, and then reconnect it to the operational controller.
4. Return to [step d](#) on page 4, and then proceed.

- ↻ 3. For the cache module to be replaced, complete one of the following two options after the message, Remove the slot x cache module within 2 minutes, is displayed:
 - ↻ ■ For StorageWorks Model 2100 and 2200 enclosures, disengage both retaining levers, and then remove the “other controller” cache module.
 - ↻ ■ For all other supported enclosures:
 - ↻ a. Disengage both retaining levers, and then partially remove the “other controller” cache module—about halfway.



Caution: You must disable the ECB before disconnecting the ECB Y-cable from the cache module. (If the ECB status light is off, this indicates that the ECB is disabled.) Failure to disable the ECB can result in cache module damage.



- b. Disable the ECB by pressing the battery disable switch until the status light stops flashing. This should take approximately 5 seconds.



- c. Disconnect the ECB Y-cable from the “other controller” cache module.



- d. Remove the cache module from the enclosure.

- ▲ 4. For the operational controller, observe that *FRUTIL* restarts I/O ports, disables writeback caching and mirrored writes, indicates that the mirrored cache is disabled, and then terminates.



- 5. Enter **N(o)** to the question for a replacement cache module.
FRUTIL exits.



- 6. For the operational controller, place the cache module on an antistatic bag or a grounded antistatic mat.



- 7. For the cache module to be replaced, note the location for each DIMM in the cache module that was replaced, and remove them. Use the following substeps to remove the DIMMs:

Note: The DIMMs must be removed for installation in the replacement cache module.



- a. Press down on the DIMM retaining clips at both ends of the DIMM being removed.



- b. Gently remove the DIMM from the DIMM slot, and then place the DIMM on an antistatic bag or a grounded antistatic mat.



- c. Repeat [step a](#) and [step b](#) above for each DIMM.

Installing a cache module

Perform the following steps to install an HSG60 and HSG80 cache module in an HSG60 and HSG80 subsystem. These instructions are for cache modules in a dual-redundant controller configuration.



Caution: ESD can easily damage a cache module or a DIMM. Wear a snug-fitting, grounded ESD wrist strap.








Note: The replacement cache module *must* contain the same cache memory configuration as the module being replaced.

Note: If you are installing a cache module after resolving a failed cache state, refer to the *HP StorageWorks HSG60 and HSG80 Array Controller and Array Controller Software Maintenance and Service Guide*.




Note: The operational controller and the replacement controller references that appear in this section may be reversed. The operational controller is the one attached to the terminal or PC and the one from which *FRUTIL* is executed.

Note: When replacing DIMMs, see [Figure 3](#) on page 3.

Note: If you are installing a cache module after resolving a failed cache state (refer to Table 14 through Table 16 of the “Controller and Cache Replacement Troubleshooting” appendix in the *HP StorageWorks HSG60 and HSG80 Array Controller and Array Controller Software Maintenance and Service Guide*), the operational controller and the replacement controller references that appear in this section may be reversed. The operational controller is the one attached to the terminal or PC and the one from which *FRUTIL* is executed.

-  1. For the replacement cache module, insert each DIMM straight into the appropriate slot of the replacement cache module ([Figure 3](#) on page 3), ensuring that the notches in the DIMM align with the tabs in the slot. Use the following substeps to install the DIMMs:
 -  a. Press the DIMM gently into the slot until it is seated at both ends.
 -  b. Ensure that the two retaining clips for the DIMM are engaged.
 -  c. Make sure both ends of the DIMM are firmly seated in the slot and both retaining clips engage the DIMM.
 -  d. Repeat [substep 1a](#) through [substep 1c](#) above for each DIMM.
-  2. For the operational controller, complete the following substeps:
 -  a. Connect a PC or terminal to the operational controller, if not already connected.

Note: The controller connected to the PC or terminal becomes “this controller.” The controller for the replacement cache module becomes the “other controller.”

-  b. Start *FRUTIL* by entering the following command:
`RUN FRUTIL`
-  c. Enter **N(o)** to the question about replacing the cache battery.
-  d. From the **FRUTIL Main Menu**, enter **2** for the **Install a controller or cache module** option.



Install Options:

1. Other controller and cache module
2. Other controller module
3. Other cache module
4. Exit

NOTE: OPTION 1 DISABLED (So: Do cache, then controller.)

Enter choice: 1,2,3,4 ->



Figure 4: Install Options Screen

-  e. Enter **3** to install the other cache module. The **Slot Designations** screen is displayed.
-  f. Enter **Y(es)** to confirm the intent to install the slot *x* cache module.
FRUTIL quiesses all device ports, indicates a time limit of 2 minutes to install the replacement cache module, and begins displaying the time remaining in 10-second intervals.



Caution: Wait for *FRUTIL* to quiesce the device ports—indicated by an All device ports quiesced message. Failure to allow the ports to quiesce can result in data loss. Quiescing can take several minutes.

Note: A countdown timer allows you a total of 2 minutes to install the cache module. After 2 minutes, “this controller” exits *FRUTIL* and resumes operations. If this happens, return to [step b](#), and then proceed.

-  3. For the replacement cache module, complete the following substeps:
 -  a. Carefully align and partially insert the cache module in the appropriate guide rails.




Caution: Misalignment of the cache module in the guide rails can damage the backplane.



Caution: If your cache module is in a BA370 enclosure, you must disable the ECB. Failure to disable the ECB can result in cache module damage. To disable the ECB, complete the following steps:

1. Press the battery disable switch on the battery module.
 2. Connect the ECB Y-cable to the cache module.
- Refer to other ECB documentation for additional and specific ECB details.



-  b. After the message, **Install the new cache module in slot x within 2 minutes**, is displayed, insert the replacement cache module completely into the appropriate bay, and engage the cache module retaining levers.

- ▲ 4. For the operational controller, note that in Mirrored mode, *FRUTIL* initializes the mirrored portion of the replacement cache module, checks for old data on the cache module, and then restarts all device ports. After device ports restart, *FRUTIL* tests the cache module and the ECB. After the tests conclude, the device ports are quiesced, and a mirror copy of the cache module data is created on the newly installed cache module.

- 🌀 5. Determine whether the controller associated with the replacement cache module is installed, and then complete one of the following options.

- 🌀 ■ If the controller associated with the replacement cache module is not installed, *FRUTIL* exits automatically. After *FRUTIL* exits, refer to other instructions for installing an HSG60 or HSG80 array controller in dual-redundant configurations.
 - If the controller associated with the replacement cache module is installed, continue to the next step.

- 🌀 6. For the controller associated with the replacement cache module, note and observe the following:

- 🌀 ■ The controller restarts.

- 🌀 ■ The controller restart takes up to 60 seconds, indicated by the temporary cycling of the port LEDs and a flashing controller **Reset** button.

- 🌀 If the controller does not restart, complete the following substeps:

- 🌀 a. Press and hold the controller **Reset** button on the controller.

- 🌀 b. Reseat the program card in the controller.

- 🌀 c. Release the controller **Reset** button.

- ▲ 7. For the operational controller, complete the following substeps:

- ▲ a. Observe that *FRUTIL* restarts the device ports and then exits.

- ▲ b. Identify invalid or failed cache conditions by entering the following command:

`SHOW THIS_CONTROLLER`

- ▲ c. Clear invalid or failed cache conditions, if any exist. Refer to Table 14 through Table 16 in the “Controller and Cache Replacement Troubleshooting” appendix of the *HP StorageWorks HSG60 and HSG80 Array Controller and Array Controller Software Maintenance and Service Guide* for more information on clearing invalid or failed cache conditions.



Caution: Failure to clear an invalid cache message (especially a Cache is FAILED message) *before* setting the Failover mode can result in a recursive bugcheck error message that renders the controller unusable.

- ▲ d. Disconnect the PC or terminal from the maintenance port of the operational controller.

- 🌀 8. For the controller associated with the replacement cache module, complete the following substeps:

- 🌀 a. Connect a PC or terminal to the maintenance port of the controller associated with the cache module to be replaced.

- 🌀 b. Identify any invalid or failed cache conditions, if any exist, by entering the following command:

`SHOW THIS_CONTROLLER`

- 🌀 c. Clear invalid or failed cache conditions, if any exist. Refer to Table 14 through Table 16 of the “Controller and Cache Replacement Troubleshooting” appendix in the *HP StorageWorks HSG60 and HSG80 Array Controller and Array Controller Software Maintenance and Service Guide* for more information on clearing invalid or failed cache conditions.



Caution: Failure to clear an invalid cache message (especially a Cache is FAILED message) *before* setting the Failover mode can result in a recursive bugcheck error message that renders the controller unusable.

- 🌀 d. Disconnect the PC or terminal from the maintenance port of the controller associated with the replacement cache module.

- ▲ 9. For the operational controller, complete the following substeps:

- ▲ a. Connect a PC or terminal to the maintenance port.



Caution: In [substep 9b](#) below, entering the appropriate `SET` command is critical. Enabling an incorrect Failover mode can cause loss of data and incur system down time. Verify the original failover configuration, and use the appropriate `SET` command to restore this configuration.

- ▲ b. Re-establish the previous Failover mode by entering one of the following commands:

`SET FAILOVER COPY=THIS_CONTROLLER`

or

`SET MULTIBUS_FAILOVER
COPY=THIS_CONTROLLER`

Note: After you enter the appropriate `SET` command, the controller restarts. A controller restart can take as long as 60 seconds, indicated by the temporary cycling of the port LEDs and a flashing **Reset** button.

The `SET` command copies the subsystem configuration from “this controller” to the “other controller.”

- ▲ c. Verify the failover configuration by entering the following commands:
`SHOW THIS_CONTROLLER`
`SHOW OTHER_CONTROLLER`
- ▲ d. Verify that the controller cache and, if enabled, mirrored cache are good. Refer to Table 14 through Table 16 in the “Controller and Cache Replacement Troubleshooting” appendix of the *HP StorageWorks HSG60 and HSG80 Array Controller and Array Controller Software Maintenance and Service Guide* for more information on clearing invalid or failed cache conditions.
- ▲ e. Disconnect the PC or terminal from the controller maintenance port.